

GUIDELINES FOR CLEARANCE TO CONSTRUCTION OPERATIONS

The letter transmitting the General Plan to the District shall include information concerning the working space which will be required for use by the Contractor during construction. If the available clearances to the work appear inadequate to conduct the operation in a safe manner, lane closure or other measures to provide the necessary space should be recommended.

When recommendations are made for the diversion or halting of traffic, the letter should include specific information concerning the lane or lanes involved and the sequence of operations along with an estimate of the time each diversion or closure will be required.

The District should be asked to comment on this information. This response will be helpful in determining if we have selected the proper structure type for the site.

After approval of the General Plan by the District, the District project engineer should be kept informed of any changes in the bridge design that would affect traffic handling. The Structures project designer should review the traffic handling plan and verify it prior to PS&E.

Attached are guidelines that should be used in developing the above-mentioned information.



Philip C Warriner



Guy D. Mancarti

JRM:jgf
Attachments

Supersedes Memo to Designers 21-19 dated September 15, 1975
and Supplement 1 dated May 1979

GUIDELINES FOR CLEARANCE TO CONSTRUCTION OPERATIONS

The construction of structures across or adjacent to roadways which are open to traffic requires that adequate space be provided between the work and traffic so that the construction operations can be performed without hazard to the traveling public and to the workers. Special traffic handling, such as intermittent or long-term lane closures, detours, staging to work, etc., may be required to provide the necessary space.

During the General Plan development stage, the designer shall review the available information to determine if adequate space is available or if special traffic handling may be necessary.

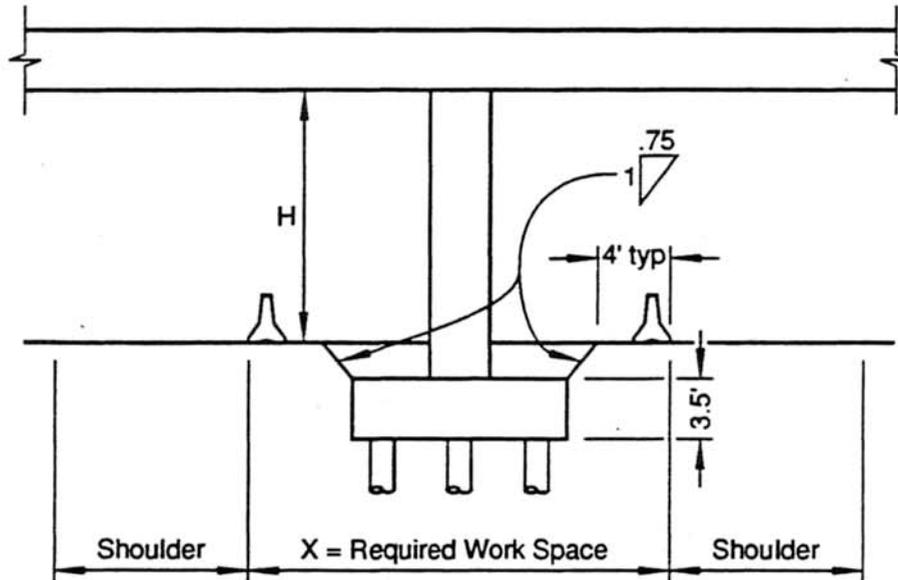
In the transmittal letter forwarding the General Plan, the designer should inform the District if there is a need for special traffic handling. For example, for a bridge with a bent to be built in a 30-foot median, the designer should include a statement such as:

“Based on the assumption of (choose applicable type) spread footings/pile supported footings/drilled shafts, the construction of the footings and columns in the median will require a working space of approximately ___ feet between the traffic faces of the temporary railing for a period of ___ weeks. Construction of falsework bents will require approximately ___ feet between the traffic faces of the temporary railing for a period of approximately ___ weeks. (The existing median is not wide enough to conduct the operations safely.) Lane closures or other means to provide the necessary clearance will be required unless special and more expensive construction methods are employed.”

The intent of this notification is to provide the District with relevant data associated with the structure type selected, and to initiate action so that adequate provisions are made in the early stages of design and to avoid last minute changes.

The following are some typical situations. The dimensions specified are those which would be required if conventional construction methods are used. They may be reduced by the use of special and more expensive construction methods. Before making any reduction, all factors must be carefully weighed. Various alternatives such as detouring traffic, narrowing traffic lanes, etc., should be considered. Deviations should be discussed with Construction.

I. Construction of Footings and Columns in Existing Median.



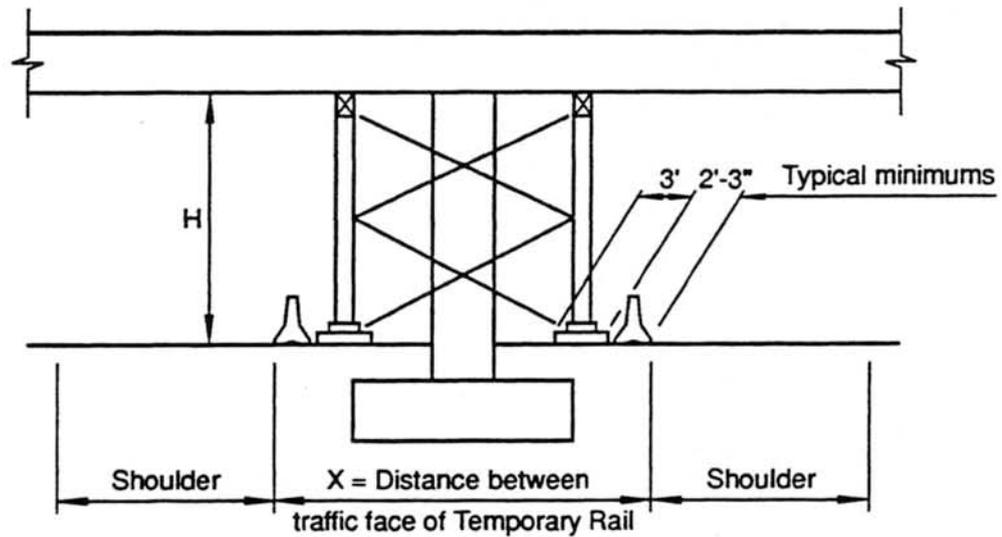
FOOTING AND COLUMN CONSTRUCTION

- A. For $H \leq 30'$, X depends on footing width. X must be at least 22' to allow for guyed column cage and working equipment.
- B. For $H > 30'$ consult Construction for space required for guying column cage or for providing support by other means.

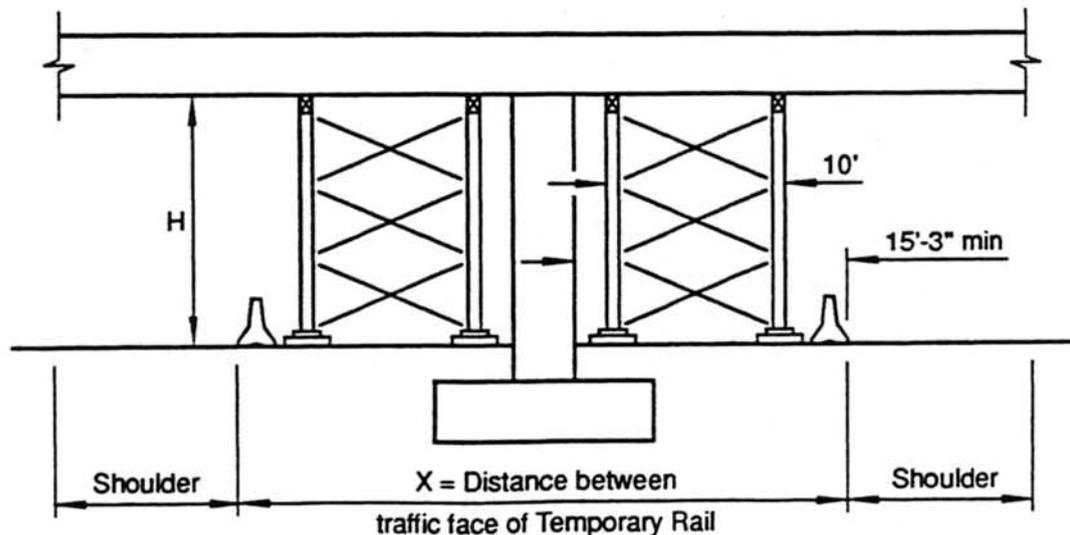
Under certain conditions such as when pile driving is not required or column cages can be guyed from existing bridges, a reduction in the work space is possible. Anticipate a lane closure for loading excavation into trucks and placing concrete from transit mixer.

The time required to complete the footing and column construction will range from 2 to 8 weeks depending on the number of columns.

2. Falsework in Median



- A. For $H \leq 30'$ where falsework shoring is not required outside the edge of deck (low skew bridge) $X = \text{column width} + 10'-6''$ minimum.
- B. For $H \leq 30'$ where falsework shoring is needed past the edge of deck (high skew bridges when falsework spans are placed normal to roadway) $X = 18'$ minimum.
- C. For $H > 30'$ where falsework shoring is not required outside the edge of deck (low skew bridge) $X = 18'$ minimum, consult with construction if column heights and falsework spans are large.



- D. For $H > 30'$ where falsework shoring is needed past the edge of deck (high skew bridges when falsework spans are placed normal to roadway) $X = \text{column width} + 30'-6''$.

- E. Intermittent lane closures will be required during falsework erection and removal.
- F. The falsework will normally remain in place approximately two months.

3. Construction of an Earth Retaining Structure Adjacent to Traffic

This situation usually arises when the roadway is being widened. Generally, retaining walls can be constructed by intermittent closure of the adjacent traffic lane. The space provided for the construction of the new lane generally gives enough clearance for walls on spread footings and these walls can be built with only minimal closures of the adjacent lane. When pile-driving is involved, the adjacent lane must be closed during the time when driving is being done.

For mechanically stabilized embankment walls, traffic above the wall may need to be rerouted to allow space to install the soil reinforcement strips. The District should be notified of this requirement.

4. Fabricating and Erecting Precast Concrete Girders or Structural Steel Girders

Precast or structural steel girders over 110' long or weighing over 95 kips usually cannot be transported on the highway in one piece. These girders are segmentally hauled to the job and joined at the site. However girders up to 118' length have been permitted with special expensive equipment, and the length limitation does not apply where the girders (such as at an overhead) may be transported by rail. Structures Maintenance should be consulted when girder lengths exceed 110'.

Our standard special provisions prevent the casting, assembling or storing of girders in the median or within 20 feet of the edge of the pavement. The designer shall check with the District to determine if adequate space is available at the bridge site to assemble these girders.

When erecting girders over traveled ways, traffic must always be stopped or detoured. The erection of a member weighing up to 100 kips will usually require the stopping of traffic no more than 30 minutes. However, heavier members, or lifting over 30 feet high will usually take longer.

5. Erection and Removal of Falsework and Forms

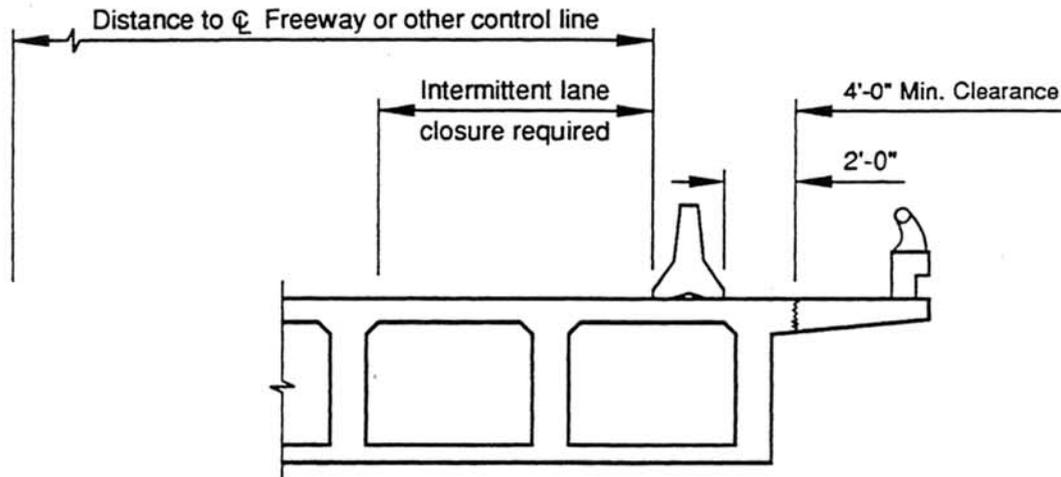
Traffic must be rerouted or stopped for 30 minute minimum intervals during the erection and removal of falsework stringers over traffic openings. Stripping of deck soffit forms usually requires lane closures under the immediate area of stripping. However when stripping over the middle lanes, it is desirable to close one of the adjacent lanes so traffic is not routed on both sides of the closed lane.

6. Sidehill Viaduct, Half-Width Construction, Special Retaining Walls, etc.

These special designs are usually used when construction space is limited. The designer should point out operations that will require short or long-term closure of all or part of the roadway to traffic.

7. Widening

When forwarding the General Plan to the District, the location of the temporary traffic barrier should be shown on the Plans and the District should be asked to comment on it. Location of the barrier is a trade-off between giving the workers enough space versus giving traffic as much space as possible. The minimum distance between the cut line, where the existing deck is to be removed, and the edge of the barrier is two feet. This distance may be increased if traffic conditions permit.



8. Bridge Removal

Refer to Memo to Designers 9-5 for a discussion of the various methods of bridge removal. The District should be advised as to which method we believe is appropriate and asked to confirm this decision.

9. Conclusion

There are many other situations where special traffic control is necessary. The Construction Office is always available for consultation. Although traffic control is the responsibility of the District, our timely input to the Districts is necessary so that a well developed traffic control plan is included in the contract.

The attached sketches show the space normally needed for some typical operations in the median.



21-19 GUIDELINES FOR CLEARANCE TO CONSTRUCTION OPERATIONS

The letter transmitting the General Plan to the District shall include information concerning the working space which will be required for use by the Contractor during construction. If the available clearances to the work appear inadequate to conduct the operation in a safe manner, lane closure or other measures to provide the necessary space should be recommended.

When recommendations are made for the diversion or halting of traffic, the letter should include specific information concerning the lane or lanes involved and the sequence of operations along with an estimate of the time each diversion or closure will be required.

The District should be asked to comment on this information. This response will be helpful in determining if we have selected the proper structure type for the site.

After approval of the General Plan by the District, the District project engineer should be kept informed of any changes in the bridge design that would affect traffic handling. The Structures project designer should review the traffic handling plan and verify it prior to PS&E.

The following are guidelines that should be used in developing the above-mentioned information.

General

The construction of structures across or adjacent to roadways which are open to traffic requires that adequate space be provided between the work and traffic so that the construction operations can be performed without hazard to the traveling public and to the workers. Special traffic handling, such as intermittent or long-term lane closures, detours, staging to work, etc., may be required to provide the necessary space.

During the General Plan development stage, the designer shall review the available information to determine if adequate space is available or if special traffic handling may be necessary.

In the transmittal letter forwarding the General Plan, the designer should inform the District if there is a need for special traffic handling. For example, for a bridge with a bent to be built in a 9 meter wide median, the designer should include a statement such as:

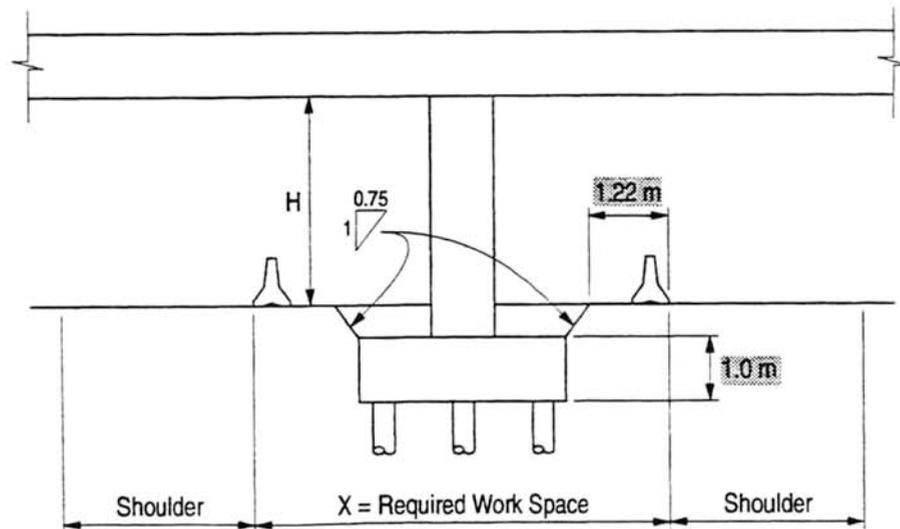
Memo converted to metric.

“Based on the assumption of (choose applicable type) spread footings/pile supported footings/drilled shafts, the construction of the footings and columns in the median will require a working space of approximately ___ meters between the traffic faces of the temporary railing for a period of ___ weeks. Construction of falsework bents will require approximately ___ meters between the traffic faces of the temporary railing for a period of approximately ___ weeks. (The existing median is not wide enough to conduct the operations safely.) Lane closures or other means to provide the necessary clearance will be required unless special and more expensive construction methods are employed.”

The intent of this notification is to provide the District with relevant data associated with the structure type selected, and to initiate action so that adequate provisions are made in the early stages of design and to avoid last minute changes.

The following are some typical situations. The dimensions specified are those which would be required if conventional construction methods are used. They may be reduced by the use of special and more expensive construction methods. Before making any reduction, all factors must be carefully weighed. Various alternatives such as detouring traffic, narrowing traffic lanes, etc., should be considered. Deviations should be discussed with Construction.

1. Construction of Footings and Columns in Existing Median



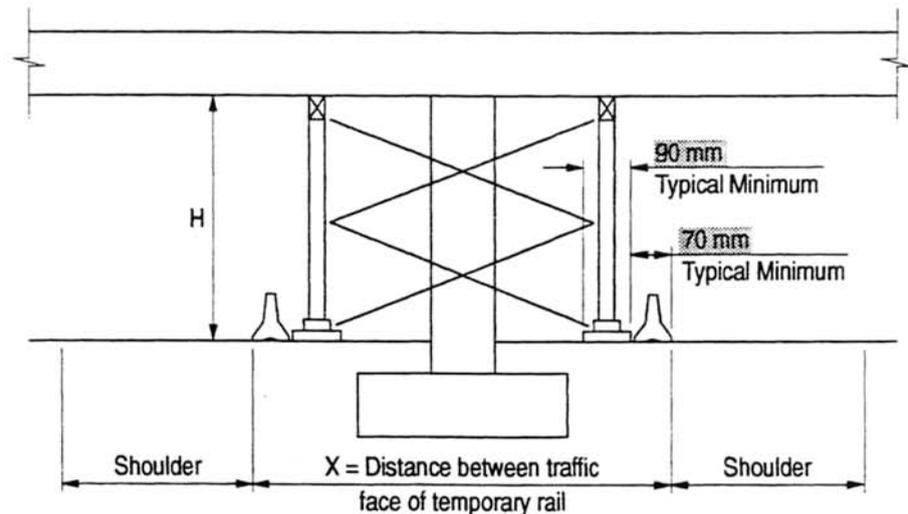
Footing and Column Construction

- A. For $H \leq 9\text{ m}$, X depends on footing width. X must be at least 6.7 m to allow for guyed column cage and working equipment.
- B. For $H > 9\text{ m}$ consult Construction for space required for guying column cage or for providing support by other means.

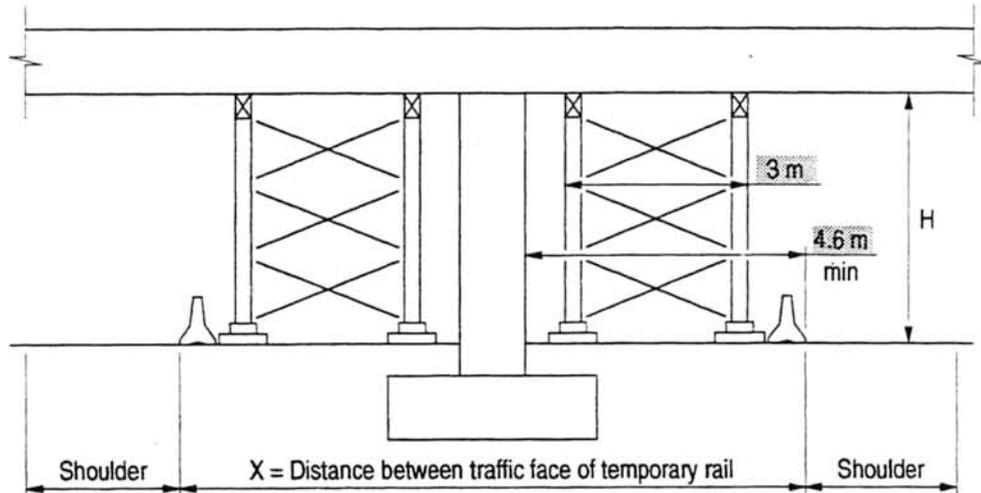
Under certain conditions such as when pile driving is not required or column cages can be guyed from existing bridges, a reduction in the work space is possible. Anticipate a lane closure for loading excavation into trucks and placing concrete from transit mixer.

The time required to complete the footing and column construction will range from 2 to 8 weeks depending on the number of columns.

2. Falsework in Median



- A. For $H \leq 9\text{ m}$ where falsework shoring is not required outside the edge of deck (low skew bridge) $X = \text{column width} + 3.2\text{ m}$ minimum.
- B. For $H \leq 9\text{ m}$ where falsework shoring is needed past the edge of deck (high skew bridges when falsework spans are placed normal to roadway) $X = 5.5\text{ m}$ minimum.
- C. For $H > 9\text{ m}$ where falsework shoring is not required outside the edge of deck (low skew bridge) $X = 5.5\text{ m}$ minimum, consult with Construction if column heights and falsework spans are large.



- D. For $H > 9 \text{ m}$ where falsework shoring is needed past the edge of deck (high skew bridges when falsework spans are placed normal to roadway) $X = \text{column width} + 9.2 \text{ m}$.
- E. Intermittent lane closures will be required during falsework erection and removal.
- F. The falsework will normally remain in place approximately two months.

3. Construction of an Earth Retaining Structure Adjacent to Traffic

This situation usually arises when the roadway is being widened. Generally, retaining walls can be constructed by intermittent closure of the adjacent traffic lane. The space provided for the construction of the new lane generally gives enough clearance for walls on spread footings and these walls can be built with only minimal closures of the adjacent lane. When pile-driving is involved, the adjacent lane must be closed during the time when driving is being done.

For mechanically stabilized embankment walls, traffic above the wall may need to be rerouted to allow space to install the soil reinforcement strips. The District should be notified of this requirement.

4. Fabricating and Erecting Precast Concrete Girders or Structural Steel Girders

Precast or structural steel girders over 33 m long or weighing over 43 tonne usually cannot be transported on the highway in one piece. These girders are segmentally hauled to the job and joined at the site. However girders up to 36 m length have been permitted with special expensive equipment, and the length limitation does not apply where the girders (such as at an overhead) may be transported by rail. Structures Maintenance should be consulted when girder lengths exceed 33 m.

Our standard special provisions prevent the casting, assembling or storing of girders in the median or within 6 m of the edge of the pavement. The designer shall check with the District to determine if adequate space is available at the bridge site to assemble these girders.

When erecting girders over traveled ways, traffic must always be stopped or detoured. The erection of a member weighing up to 45 tonne will usually require the stopping of traffic no more than 30 minutes. However, heavier members, or lifting over 9 m high will usually take longer.

5. Erection and Removal of Falsework and Forms

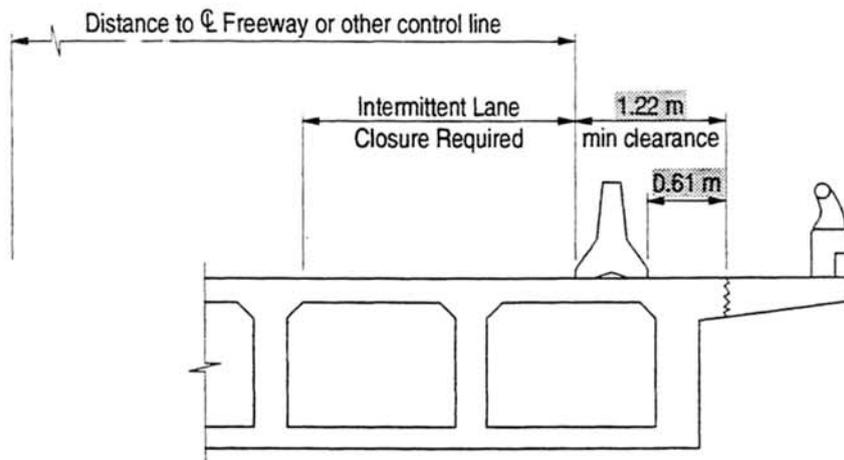
Traffic must be rerouted or stopped for 30 minute minimum intervals during the erection and removal of falsework stringers over traffic openings. Stripping of deck soffit forms usually requires lane closures under the immediate area of stripping. However when stripping over the middle lanes, it is desirable to close one of the adjacent lanes so traffic is not routed on both sides of the closed lane.

6. Sidehill Viaduct, Half-Width Construction, Special Retaining Walls, etc.

These special designs are usually used when construction space is limited. The designer should point out operations that will require short or long-term closure of all or part of the roadway to traffic.

7. Widening

When forwarding the General Plan to the District, the location of the temporary traffic barrier should be shown on the Plans and the District should be asked to comment on it. Location of the barrier is a trade-off between giving the workers enough space versus giving traffic as much space as possible. The minimum distance between the cut line, where the existing deck is to be removed, and the edge of the barrier is **0.61 m**. This distance may be increased if traffic conditions permit.



8. Bridge Removal

Refer to Memo to Designers 9-5 for a discussion of the various methods of bridge removal. The District should be advised as to which method we believe is appropriate and asked to confirm this decision.



9. Conclusion

There are many other situations where special traffic control is necessary. The Construction Office is always available for consultation. Although traffic control is the responsibility of the District, our timely input to the Districts is necessary so that a well developed traffic control plan is included in the contract.

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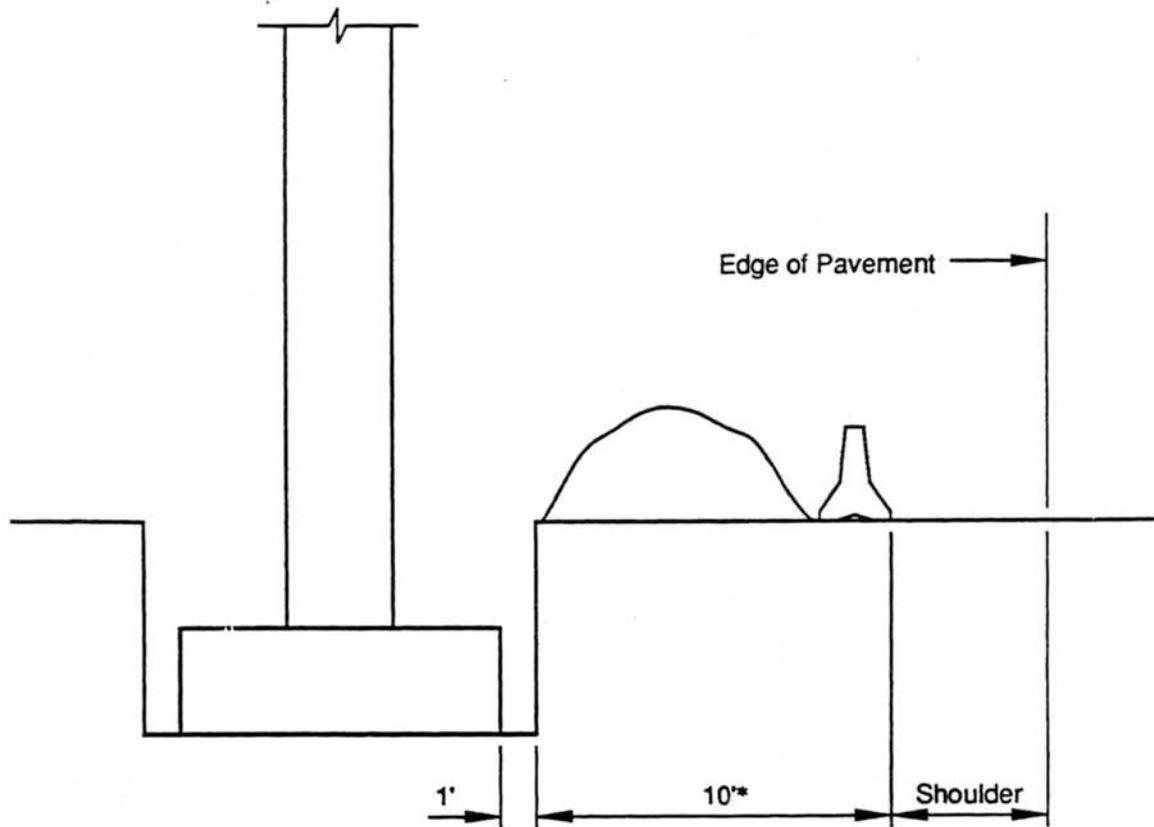
Richard D. Land



Shannon H. Post

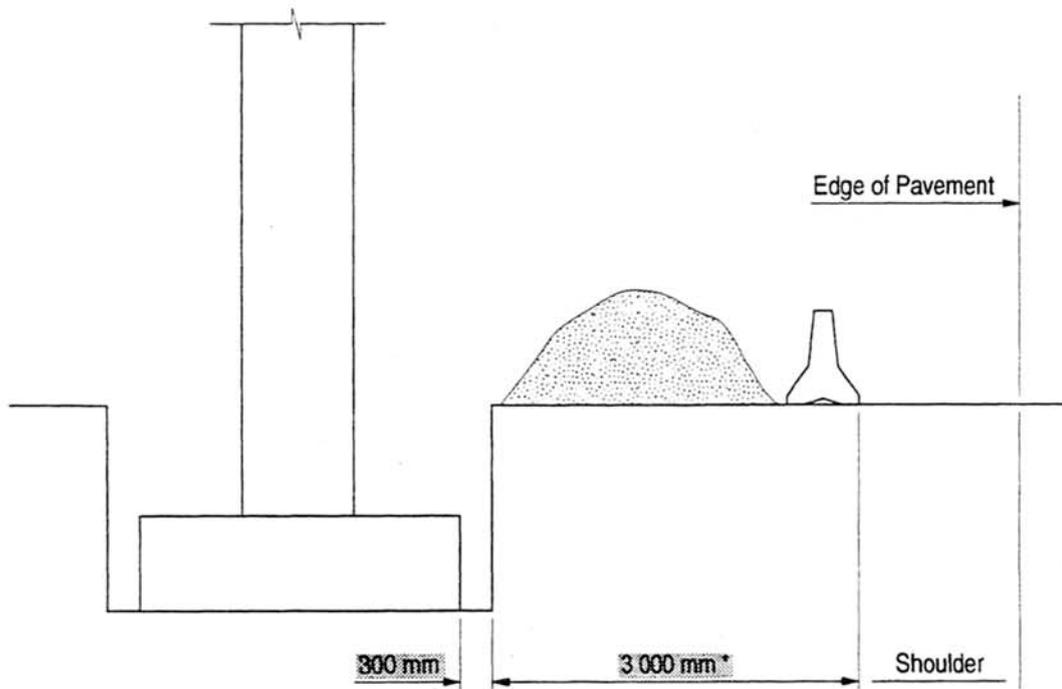
JRM:jgf/jlw

Attachments



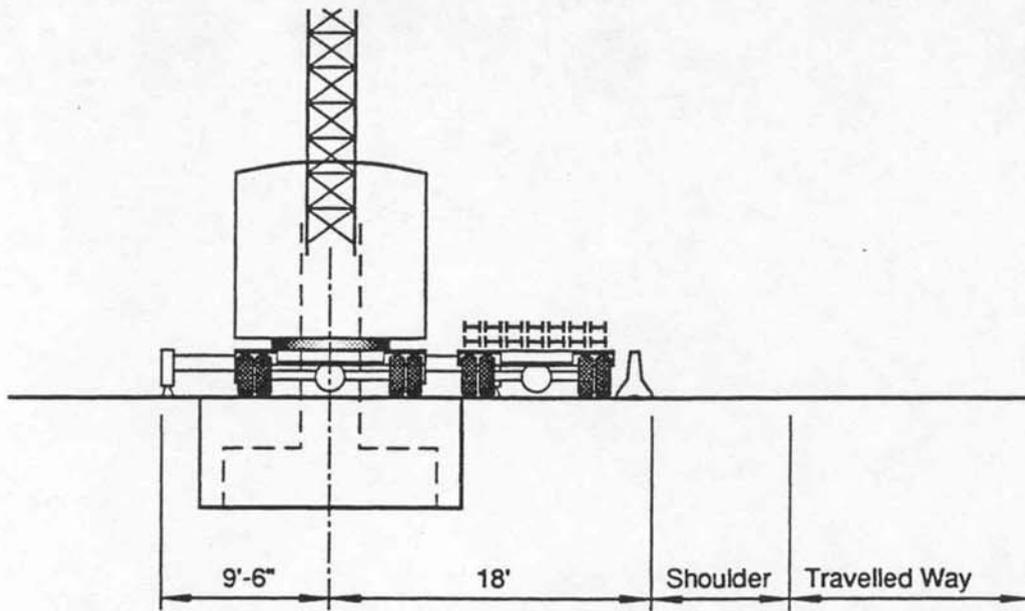
* For footing depth greater than 5' add 0.75 times that portion of depth that exceeds 3.5' to allow for excavation face slope.
i.e. 8' depth $(8 - 3.5)(0.75) = 3.4 + 10 = 13.4$

FOOTING EXCAVATION



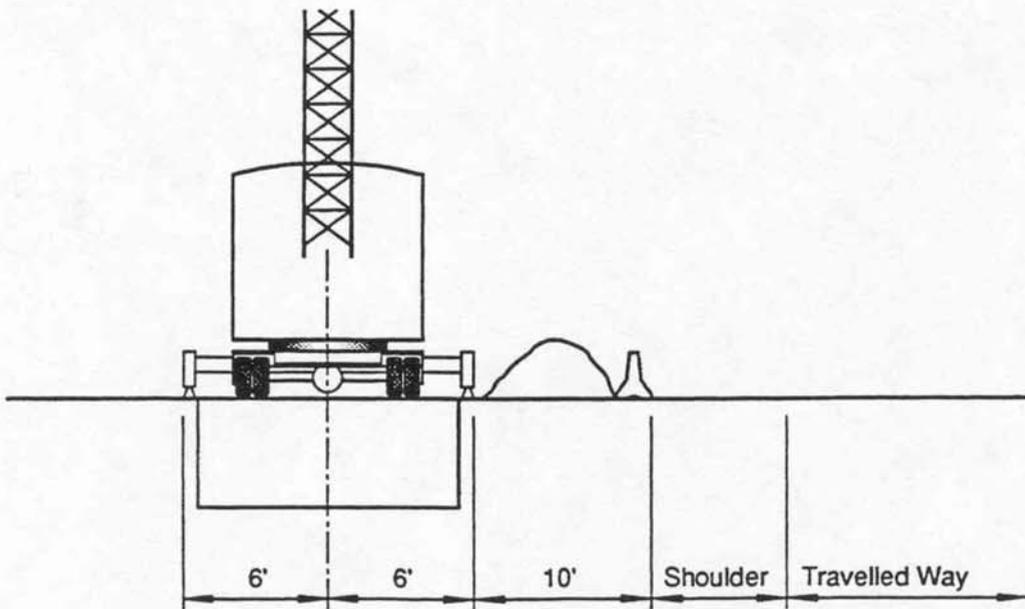
* For footing depth greater than 1520 mm add 0.75 times that portion of depth that exceeds 1060 mm to allow for excavation face slope. i.e., 2500 mm depth $(2500 - 1060)(0.75) = 1080 + 3000 = 4080$ mm

Footing Excavation



Note: Out-to-out width of outriggers for a 50 ton crane is about 22 feet.

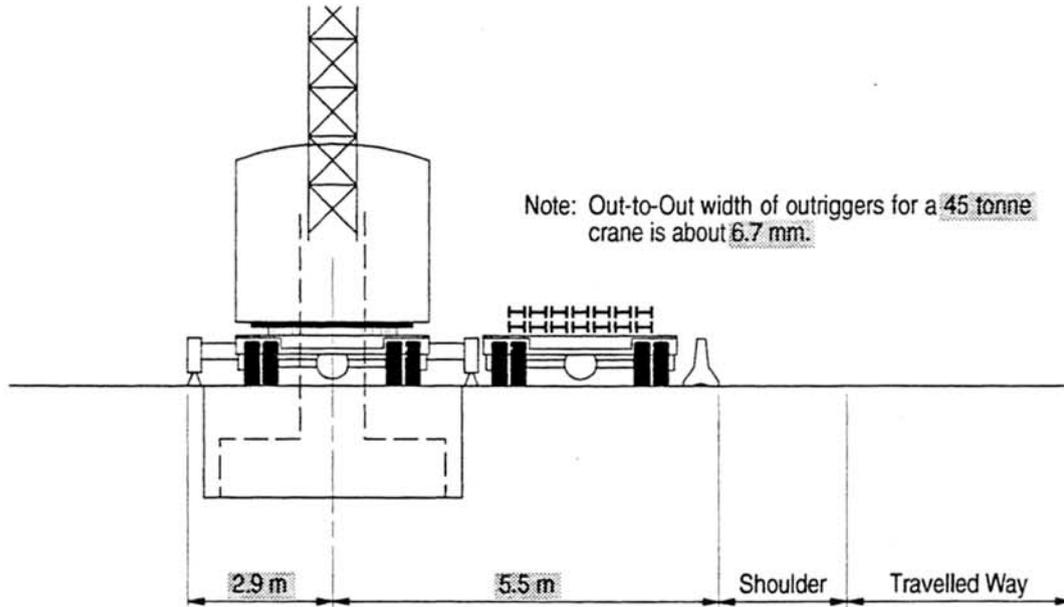
PILE DRIVING



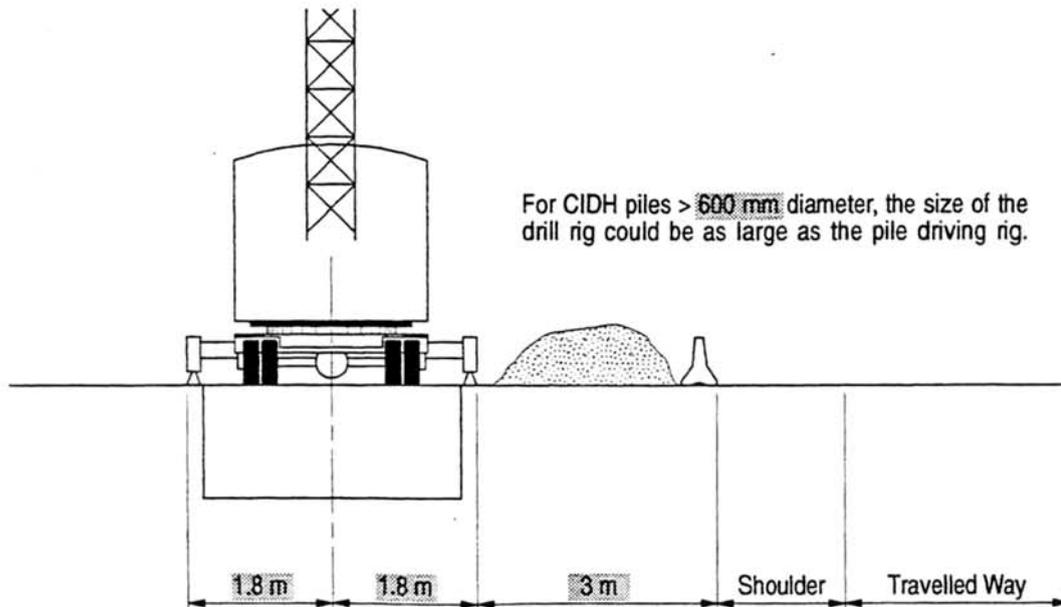
For C.I.D.H. Piles > 2 foot diameter, the size of the drill rig could be as large as the pile driving rig.

DRILLING SMALL CIDH PILES

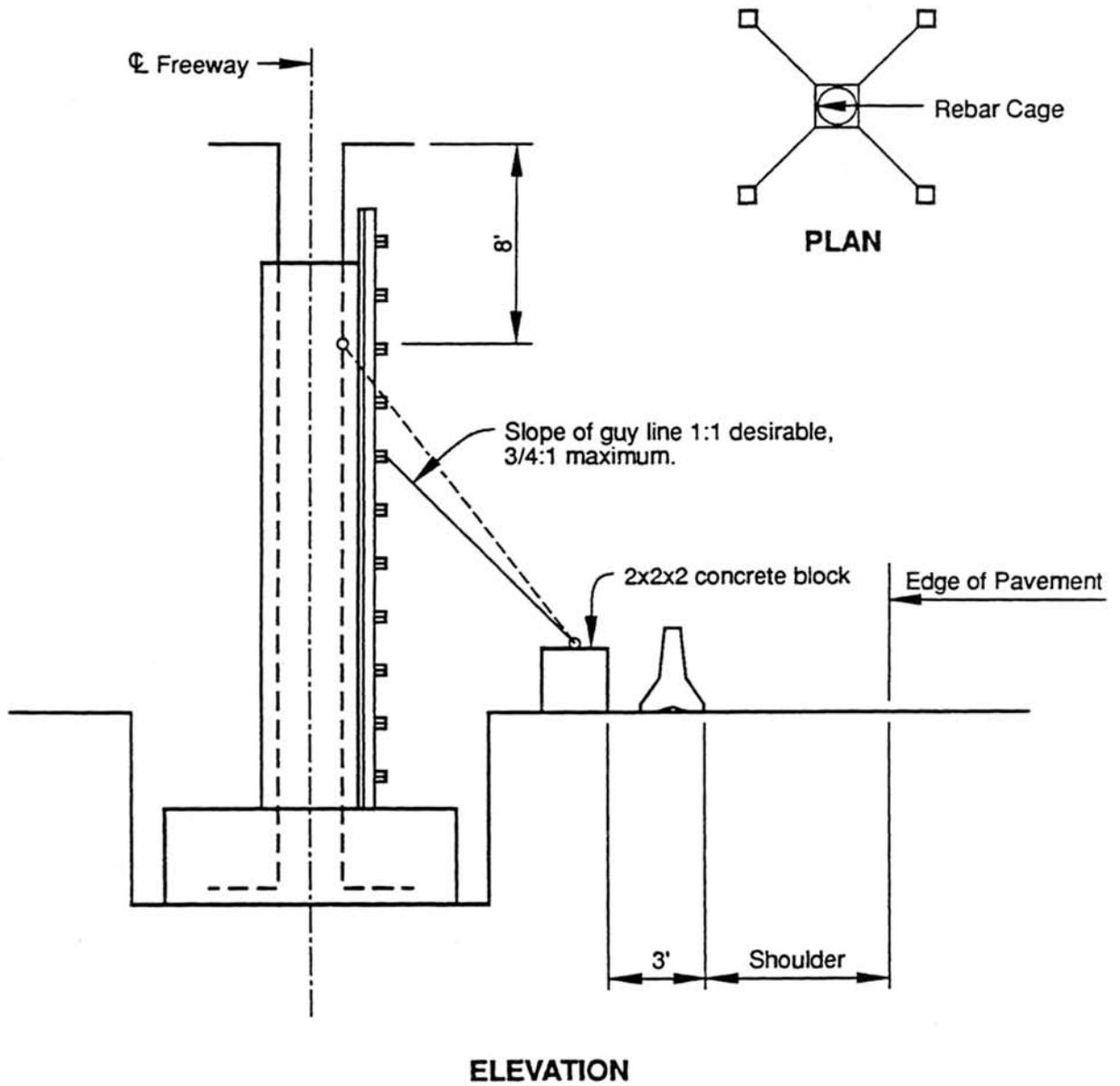
ATTACHMENT 2



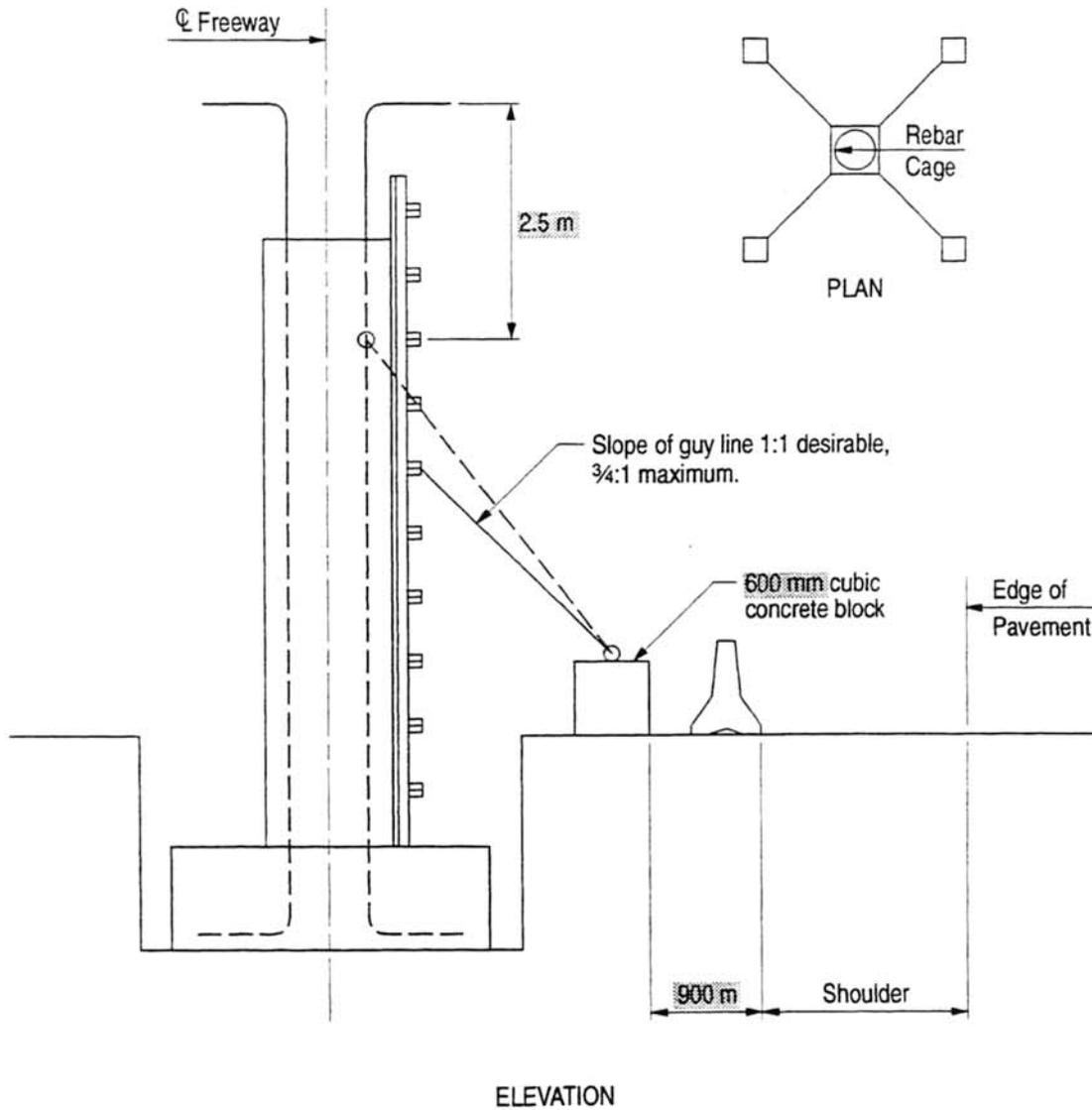
Pile Driving



Drilling Small CIDH Piles



COLUMN CONSTRUCTION



Column Construction